DOCUMENT RESUME

ED 232 203 CS 207 756

AUTHOR Tillinghast, Diana Stover; Visvanathan, Nalini
TITLE The Electronic Newspaper: Building a Profile of Potential Users.
PUB DATE Aug 83
NOTE 37p.; Paper presented at the Annual Meeting of the Association for Education in Journalism and Mass Communication (66th, Corvallis, OR, August 6-9, 1983).
PUB TYPE Reports - Research/Technical (143) -- Speeches/Conference Papers (150)

EDRS PRICE MF01/PC02 Plus Postage.
DESCRIPTORS Computers; Females; Futures (of Society); Information Sources; Males; *Media Research; *Newspapers; Reader Response; Sex Differences; *Student Attitudes; Technological Advancement; *Videotex

ABSTRACT

A study was conducted to determine how a population viewed the prospect of receiving news and information electronically. Subjects were 529 students attending Stanford University (California) in the heart of the "Silicon Valley" computer industry. The survey was conducted by mail with a telephone follow-up, and included 108 questions on usage of and attitudes toward traditional media as well as the newer communication technologies and computers. The results indicated that two out of five students: (1) believe that newspapers as they are currently known will be replaced by computerized data banks, and (2) if given the choice, would prefer to receive their news from electronic newspapers rather than from traditional newspapers. Individuals preferring electronic newspapers were more computer oriented in terms of their attitudes toward and their use of computers. Also, men were more likely than women to want to receive their news and information electronically. Since the major differences between groups were attitudes toward and use of computers, it appears that, as society as a whole becomes more familiar with computers, a major barrier to the acceptance of the delivery of news and information electronically will be overcome. (HTH)

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# The Electronic Newspaper: Building a Profile of Potential Users

By

Diana Stover Tillinghast and Nalini Visvanathan

Department of Communication

Stanford University

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Presented to the Mass Communication and Society Division, Association for Education in Journalism and Mass Communication Annual Convention, Oregon State University, Corvallis, Oregon, Aug. 6-9, 1983.

CS 207756

# THE ELECTRONIC NEWSPAPER: BUILDING A PROFILE OF POTENTIAL USERS

Diana Stover Tillinghast
Assistant Professor
Department of Communication
Stanford University

Nalini Visvanathan
Doctoral Candidate
Department of Communication
Stanford University

## ABSTRACT

This exploratory study of a sample of 529 students attending Stanford University in the heart of Silicon Valley's computer industry was conducted to determine how a population that fits the early adopter profile views the prospect of receiving news and information electronically. The study found that two out of five students (1) believe that newspapers as we know them today will be replaced by computerized data banks and, (2) if given the choice, would prefer to receive their news from electronic newspapers rather than from traditional newspapers. The results supported three hypotheses. Individuals preferring electronic newspapers were more computer oriented in terms of their attitudes toward and their use of computers. Also, men were more likely than women to want to receive their news and information electronically.

Discriminant analysis showed a moderate degree of linear separation between the students preferring electronic newspapers and those preferring newspapers as indicated by the final Wilks' lambda of .68, the canonical correlation of .56 for the discriminant function and the 75 percent correct classification of cases on the basis of students' scores on the discriminating variables. The most powerful discriminating variables were the belief in the newspaper's ability to survive the challenge posed by computerized data banks as well as the attitude on whether computers will be a dehumanizing element in society. Gender, to a lesser extent, also discriminated between preferences for newspapers and electronic newspapers.

These findings are unsettling for the newspaper industry. Although the population studied is clearly not representative of American newspaper readers, the fact remains that two-fifths of the students are willing to desert their newspapers for an electronic version. This behavioral intent is particularly important since the market segment represented by the students--affluent and well educated--has traditionally been seen as including the best prospects for the next generation of newspaper readers. It is important to note that even those favoring electronic newspapers are avid newspaper readers. Since the major differences between the groups were attitudes toward and use of computers, it appears that, as society as a whole becomes more familiar with computers, a major barrier to the acceptance of the delivery of news and information electronically will be overcome.

The study results suggest that a useful conceptual framework for separating potential users of new media systems from nonusers would be to determine the extent to which the new media require both the active participation and concentration of the user as well as technical skills and positive attitudes toward that technology. Even in the homogenous Stanford student sample, differences on a passive to active continuum were evident.

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THE ELECTRONIC NEWSPAPER: BUILDING A PROFILE OF POTENTIAL USERS

In Japan, Britain, France and Canada, electronic newspapers are a functioning reality. The public can receive its news and information electronically through teletext and videotex systems. Similar systems are being developed in other European countries, including Germany, Finland and Sweden, as well as in Australia.1 Although there has been considerable interest expressed, the development of large-scale teletext and videotex systems in the United States has lagged behind other countries primarily because the systems rely on private capital, rather than on governmental funding. With the notable exceptions of QUBE, CompuServe, The Source, Dow Jones News Retrieval and The New York Times Information Service, most of the systems in the United States are experimental systems involving only a limited number of subscribers.2

Great technological changes are transforming the mass media systems used to deliver news and information throughout the world. And now that researchers have found ways to convert information on teletext and videotex to one of 30 languages, international electronic newspapers are feasible.3

The past century has been one of great change in the mass media with the advent of radio and television and, more recently, the

proliferation of new communication technologies and computers. Historically, as each technology rose to take its place in the mass media system, audience displacement of another medium occurred. When television arrived, it displaced part of the audience for movies, newspapers and radio. And now, cable is displacing the audiences for local television stations.4 One study showed that although cable had the largest impact on local network television, radio news and theater attendance, there was also a smaller impact on newspapers and other print media.5

McCombs has found support for a media constancy hypothesis--that the amount of money spent on the mass media over time has remained a relatively constant proportion of the available wealth as measured by the gross national product.6 Drawing conclusions from a case study of television, McCombs asserted that the Principle of Relative Constancy is a valid description of audience spending behavior even when highly fascinating new media appear in the marketplace. McCombs noted that previous experience in mass communication suggests that a struggle between the new media and the established channels of communication is inevitable.

With the emergence of electronic newspaper systems, what will happen to the traditional newspaper audience? Three decades ago newspapers were threatened with extinction by television. But they survived and even prospered. Will they survive a new threat? Or will electronic newspapers attract enough of an audience, and, thus, advertisers, so that this new mass medium will lead to the death of

newspapers?

Futurists such as Anthony Smith do not see newspapers as being displaced in the 1980s. Smith views the 1980s as the decade of the birth of new text services delivered to the home and the following decade as one in which the traditional newspaper "may face decline, extinction, or at least complete internal self-reappraisal."7

Although most of the publicly-owned newspaper chains have branched into cable and are experimenting with videotex or teletext, publishers and editors are generally convinced of the immortality of newspapers.8 For example, although Times Mirror has invested heavily in cable and has conducted elaborate and expensive market testing of videotex, it, nevertheless, spent $216 million in the early 1980s on new presses for its flagship newspaper, the Los Angeles Times. Publisher Tom Johnson noted that he sees the electronic distribution of news and information "as more of an emerging new slice of the media mix, rather than as an element that will displace the Los Angeles Times."9

In the United States, the questions relating to newspaper displacement and user satisfaction remain unanswered because of the experimental nature of the electronic newspaper systems, because of the secrecy involved in the proprietary research and because of the emphasis of much of the research on the commercial potential of consumer services such as home banking and shopping. A computerized literature search on electronic newspapers found that, for the most part, reports about the proprietary research have been sporadic,

incomplete and promotional.

Proprietary research has been conducted or is being conducted on the following system experiments: At&T-Knight Ridder, Viewtron; AT&T-CBS; Cox Cable, INDAX; Field Enterprises, KEYFAX; Times Mirror Videotex; and Time Video Information Services. In addition to research on test systems, some commercial research involves using simulated versions of electronic newspapers to determine user reaction. One firm, Booz-Allen and Hamilton Inc., reported spending $2 million on a two-year study that tested the responses of consumers to a simulator developed at the Massuchusetts Institute of Technology.10

Although the quality of the evaluation research was affected by its shoestring budget, one proprietary study worth noting is a study of CompuServe since it represents one of the few obtainable studies of electronic newspapers.11 Between November of 1981 and June of 1982, The Associated Press and 11 newspapers joined together to allow subscribers to the CompuServe data base to access their news electronically. The study concluded that CompuServe in its current form did not appear to affect traditional newspaper readership. However, since a sizeable number of local-area residents accessed their "hometown" newspapers through CompuServe, the study warned that sizeable penetration of an electronic newspaper in a given market could affect the print version. Only 5% of all data base users accessed the newspapers involved in the experiment. This was attributed to the $5 an hour cost of using CompuServe, the fact that

most newspapers did not update the news, preference for printed newspapers, electronic-readability problems, lack of convenience or lack of time. Radio use was unaffected, but television viewing decreased as a result of CompuServe usage. The study also found that, since CompuServe adopters were above-average magazine readers, magazines would likely be affected by electronic newspapers.

The demographic profile of a CompuServe user that emerged is a young,highly educated male with a household income well above average who owns and uses a personal computer. Many were either computer professionals or used computers as part of their work. However, new CompuServe subscribers are slowly changing this demographic profile. They represent a broader demographic group since new users include more women, lower household incomes and users whose careers are less computer oriented. The study estimated a target market for electronic home information services like CompuServe to be one out of six consumers nationwide, and noted that the upscale demographics of the target audience would represent an important group for advertising-sales efforts.

The CompuServe study also included results from a battery of questions asked in a separate national survey commissioned by The Associated Press. The questions were aimed at determining consumer acceptance of the concept of electronic home information delivery. Of the 1001 individuals surveyed, 53% felt that a system that delivers information to the home electronically either exists now or would be available within the next year. An identical percentage reported they

would be interested in subscribing to such a system. Respondents most interested in using such a system were young men. Almost three-fourths of the respondents age 18 to 24 were interested and almost three-fifths of all the men surveyed were interested. When asked what types of news and information they would be interested in receiving electronically, one-fourth of those surveyed reported they would be interested in seeing electronic editions of major American newspapers and 30% said they would be interested in The AP newswire.

In addition to the data from the CompuServe users, the study also included a national panel of 84 demographically-average users who were provided with videotext terminals and free connect time. Panelists spent an average of 6.5 minutes with newspapers during a data base session, as compared with 5 minutes for the paying CompuServe user. Panel members had numerous complaints about the service. They complained of eyestrain, they complained that the the system didn't have pictures and that some items were hard to find. They complained about problems with the system, the terminal, the experiment and the fact that using CompuServe meant tying up both their television and their telephone. Despite these problems, one-third of the panelists became paying subscribers after the in-home experiment ended.

In 1980, the non-profit Online Computer Library Center conducted a study of a videotex system designed to deliver computerized versions of the library catalogs of the Columbus, Ohio, and Franklin County libraries.12 Home banking, a video enclyopedia, public information, a community calendar and educational services were also included in the

test. The three-month study of 200 households found that people most interested in purchasing viewdata services tended to be young, well educated and affluent. They were "information hungry," heavy library users and owned the most electronic equipment.

The CompuServe and Channel 2000 users represent what Rogers has called the early adopters of a communication innovation.13 They are well educated, have a higher social status and have a greater degree of upward mobility than later adopters.

For these early adopters, technology has advanced to the point where the electronic technology used in telecommunications systems is virtually indistinguishable from that of computers.14 And, just as the technological distinction has blurred, so too the distinction between computers and other media has blurred at the user end. This is particularly the case for this generation of college students. Unlike earlier years when computers and telecommunications were used as instructional technology, both are now woven into the very fabric of institutional life at universities. As Tucker notes, the use of microcomputers and terminals have emerged "as ubiquitous tools in the service of a bewildering array of academic activities, from writing and editing to textual analysis of Shakespeare, from theater lighting control to the creation of computer art, from the analysis of Bach's fugues to the writing of original music, from bibliographic searches to the playing of chess."15 And, as Marvin and Winther note, computer literacy is a practical survival skill whose potential is realized only through user participation and interaction.16 They found that

computer users perceive computer literacy as active because success in computing is associated with a level of concentration and sense of action in the world that is assumed to be unnecessary in the conventional reading of books.

Smith has also made this point in regard to the British videotex system, Prestel: "The most important though obvious point about Prestel is that it is not a passive medium like television or the newspaper; it doesn't just happen but has to be induced. If the reader doesn't push the button, the page will not change."17

The purpose of this exploratory study of college students attending Stanford University in the heart of Silicon Valley's computer industry is to determine how a population that fits the early adopter profile views the prospect of receiving news and information electronically. The two descriptive research questions are as follows: Do students believe that newspapers as we know them today will be displaced by computerized data banks? If they had the choice, would students prefer to receive their news and information electronically? A major goal of the study is to develop a profile of the potential users of electronic newspapers as well as a profile of the individuals who will continue to prefer reading newspapers. The two explanatory research questions are as follows: How well does a set of respondent characteristics discriminate between the two groups? Which respondent characteristics are the most powerful discriminators?

Study results will be used to develop a conceptual framework for

determining what characteristics separate potential electronic newspaper users from newspaper loyalists. For example, a study premise is that media use must be seen on a passive to active continuum, with the most active media users preferring electronic newspapers. The study's three hypotheses, which are also based on the results of previous research, will be tested to determine their relevance to the conceptual framework. The hypotheses:

H1: Individuals preferring electronic newspapers will have more positive attitudes toward computers than those preferring newspapers.

H2: Individuals preferring electronic newspapers will use computers more extensively than those preferring newspapers.

H3: Men will be more likely than women to prefer electronic newspapers.

## METHODOLOGY

The survey, which included 108 questions on usage of and attitudes toward the traditional media as well as the newer communication technologies and computers, was conducted in February of 1983. The results are based on a mail survey with a telephone follow-up. The sample of 625 students was drawn from a list of the 12,376 matriculated students enrolled in courses on the Stanford campus Winter Quarter. The 529 respondents represent 85 percent of a

systematic random sample drawn from the Student Directory. The sampling error was plus or minus 4 percent.

The survey was conducted in two stages: personal in-depth interviews with 26 students followed by the mail-telephone survey. The measures used in the structured questionnaire were based on a question-by-question content analysis of the in-depth interviews. By preserving respondent language and perceptions, this questionnaire construction method produces respondent-based measures that are relatively free of researcher preconceptions.

Measures

The dependent variable used in this analysis was a nominal level behavioral intent measure of preference for either electronic newspapers or newspapers. The question is as follows:

> Media analysts forsee a time when news and information will be delivered electronically to American homes. The electronic newspaper could provide the latest news from wire services and newspapers as well as all kinds of information stored in computer data bases such as stock prices, bibliographic information, airline schedules and shopping information. A hard copy of selected news or information could be printed out if the home were equipped with a small printer.
>
> Would you prefer to receive your news electronically or would you prefer to read a newspaper?

Respondents were given the following three response categories---prefer electronic newspaper, prefer newspaper or other---and asked to explain their answers.

Table 1 lists the independent variables used in the analysis. With the exception of gender, the independent variables were either continuous variables or were treated as continuous variables as in the case of the Likert items measuring computer attitudes.

==========TABLE 1 ABOUT HERE==========

Since the questionnaire included a number of attitudinal and media behavior measures, the first step of the analysis was to determine which were the most powerful measures of the differences between the two newspaper modes. Zero-order correlations and a series of t-tests were run to determine which measures of the variables in the following theoretical categories were significantly related to the dependent variable: (1) attitudes toward computers (2) amount of media use and (3) attitudes tapping the functional importance of various media for news, information and entertainment. In addition, chi-square tests were run to see which nominal and ordinal level demographic variables were significantly related to the dependent variable. Variables that did not show significant differenes on the dependent variable were not included in the final analysis. When two or more different measures of the same variable were significant, the variable which best met the following criteria--was highly correlated with the dependent variable and had a low correlation with the other dependent variables--was selected for the analysis.

Computer attitudes consist of six Likert items, each with a range of 1-5. The items are scored so that the lower the score, the more

positive the attitudes are toward computers. To obtain this uniform interpretation two negatively-worded statements--"intimidating" and "technical"--were recoded so that the disagree and agree response categories switch position.

Computer use is an additive index of which computers respondents have used and how they have used them. The index, which measures the number of different types of computers used and the number of different ways respondents have used them, has a range of 0-14. Newspaper use is an additive index of the number of daily and Sunday newspapers read regularly--at least three times a week for dailies and three times a month for Sunday editions. The newspaper index has a range of 0-19.

Three subjective magnitude estimation scales were developed to measure how respondents rated the functional importance of the media on three dimensions.18 The three scales are as follows: (1) news, (2) information and knowledge and (3) entertainment. For each of the dimensions, respondents were asked to rate 11 media categories on a 0 to 1,000 scale in terms of how important to them personally the media are. Zero represented "no importance" and 1,000 represented "extremely important." The number 500, which represented "average importance" was used to anchor the scale. The five most sensitive measures on the dependent variable were: newspapers as a source of news; newspapers, books and computers as a source of information and knowledge; and popular magazines as a source of entertainment.

Gender, which was coded as a dummy variable, was the only demographic that was significantly related to the preference for newspaper mode.

T-tests were conducted to test the hypotheses on computer attitudes and computer use. A chi-square test was conducted to test the hypothesis on whether men were more likely than women to prefer electronic newspapers. A discriminant analysis was used as an exploratory tool to develop a conceptual framework and to determine which independent variables were good discriminators as well as to determine how well they discriminated between the two groups. The stepwise discriminant analysis procedure selected variables for entry into the analysis on the basis of their discriminating power.

## FINDINGS

The Stanford sample fits the demographic profile of early adopters of communication technologies in terms of being well educated, affluent and upwardly mobile. More specifically, the sample fits the early adopters of the CompuServe electronic newspaper who were young, affluent, well educated and experienced in using computers. The sample is also comparable to Channel 2000 Viewdata library services users who are described as young, affluent and well educated.

The sample was composed of 56 percent undergraduates and 44 percent

graduate students; 83 percent reported that their parents' income was above the U.S. median income when they left home for college.18 The average age was 23; 62 percent were men and 38 percent were women; and 88 percent were American and 12 percent were foreign students.

Descriptive findings show that, although Stanford students have a high regard for and are heavy users of the print media, they also are very much a part of the current computer revolution. Eighty-three percent of the students have used or are using computers. Thirty-nine percent have used or are using personal computers. Only three percent of the student body reported that they did not plan to use computers before graduating. Sixty-one percent of the students have used or are using computers for classwork. Other uses include: programming, 52 percent; text editing, 43 percent; computation, 42 percent; statistical analysis, 27 percent; information retrieval, 29 percent; and data management, 20 percent.

During the week before they were surveyed the students spent an average of 32.8 hours using traditional media--everything ranging from books to movies--and 4.4 hours using the new communication technologies--cable, computers and video games. Two news media findings are noteworthy: (1)despite their heavy use of books and academic periodicals for an average of 14.4 hours a week, students still found the time to be heavy users of the news media and (2)more students relied on newspapers than on news magazines or the broadcast media. The number of students who reported reading, listening to or watching each of the news media regularly--at least three times a week

or month--is as follows: newspapers, 70 percent; news magazines, 50 percent; radio news, 43 percent; and television news, 28 percent.

Most of the students could be considered newspaper loyalists. Students spent an average of 3.4 hours reading newspapers the week before they were surveyed. Slightly more than four-fifths (81%) said they were regular newspaper readers before going to college and an even greater percentage (94%) said that, once out of school, they would be regular newspaper readers.

The students, on the average, gave newspapers their top ratings as a source of news (768), followed by news magazines (551), radio (536) and television (492). As a source of information and knowledge, on the average, they rated books first (859), followed by newspapers (621), academic periodicals (571), television (397) and radio (396). Movies received the highest rating, on the average, as a source of entertainment during leisure time (661), followed by radio (638), books (621), television (534), newspapers (454) and popular magazines (436).

The findings on the study's two descriptive research questions shows that 2 out of every 5 students (1) believe that newspapers will be displaced and, (2) given the choice, would prefer electronic newspapers to their printed versions. Slightly more than two-fifths of the students believe that the widespread access to computerized data banks will eventually displace the print media as major sources of news and information. When asked to respond to the Likert

statement, 10% strongly agreed, 32% agreed, 23% neither agreed nor disagreed, 29% disagreed and 6% strongly disagreed.

When asked whether, in the future, they would rather have their news and information delivered electronically to their homes or whether they would prefer to read a newspaper, 50 percent said they would prefer newspapers, 41 percent said electronic newspapers and 9 percent checked the "other" category. An examination of the "other" responses showed that respondents were unable or unwilling to choose between the two, noting that they would prefer to use both newspaper modes. An analysis of the open-ended responses explaining the students' preferences showed that respondents were considering the tradeoffs that their choices would entail. Newspaper loyalists like the warmth and portability of newspapers, while those favoring electronic newspapers noted the value of having access to data bases containing vast amounts of information as well as the latest news.

## Bivariate Analyses

Bivariate relationships were explored at the preliminary stages of the analysis to generate a parsimonious and discriminating set of variables for the multivariate analysis, to determine the direction and magnitude of group differences and to determine whether there was support for the study's conceptual framework.

Table 1 shows that the students preferring electronic newspapers have significantly different scores from students preferring

newspapers on all of the 15 variables selected for inclusion in the discriminant analysis. The two computer hypotheses are supported. Individuals preferring electronic newspapers have more positive attitudes toward computers and have used computers more extensively than have individuals preferring newspapers.

The students who preferred electronic newspapers are more likely to believe that newspapers will be displaced by computerized data banks, that computers will help individuals to be more creative and that it was appropriate that Time magazine chose computers instead of naming a "Man of the Year" in 1982. They were also less likely to feel intimidated by computers and to feel that computers will make society too technical. Their higher scores on the computer index indicate that they have used more computer systems in more diverse ways.

In addition to differing on computers, individuals preferring electronic newspapers regularly read significantly fewer daily and Sunday newspapers than those preferring newspapers. Both groups rate the broadcast media below the scale average of 500 as sources of information and knowledge, as compared with books and newspapers. But, even more important, is the finding that individuals preferring the electronic delivery of news and information rate the broadcast media and newspapers significantly lower and books significantly higher than do those who report they will remain loyal to newspapers. This suggests support for the conceptual framework that electronic newspapers will have the least appeal for passive information seekers and the most appeal for active information seekers.

==========TABLE 2 ABOUT HERE==========

Table 2 shows that there is a significant difference between men and women in the extent and diversity of their computer use. Forty percent of the men are heavy computer users, as compared with 23 percent of the women.

==========TABLE 3 ABOUT HERE==========

Table 3 supports the third hypothesis that men will be more likely to prefer electronic newspapers than women. Half of the men preferred electronic newspapers, as compared with only one-third of the women.

Discriminant Analysis

The results of the discriminant analysis are presented in Tables 4-7 and Figure 1. The 14 discriminating variables entered into the analysis produced a discriminant function that was statistically significant at <.001. The analysis showed a moderate degree of linear separation between the students preferring electronic newspapers and those preferring newspapers as indicated by the final Wilks' lambda of .68 shown in Table 4, the canonical correlation of .56 for the discriminant function also shown in Table 4, and the 75 percent correct classification of cases shown in Table 7.

==========TABLE 4 ABOUT HERE==========

Table 4 lists the order in which the discriminating variables were included in the stepwise analysis. It should be noted that one variable originally included in the analysis was subsequently removed because it did not make a sufficient contribution to the discriminant function. The computer attitudinal variable labelled "technical" was removed from the analysis. Although the group means of "technical" were significantly different, it was apparently excluded because it shared the same discriminating information with the other computer variables.

The Wilks' lambda statistics provide inverse measures--measures which range from a minimum value of zero to a maximum value of 1.0 for no group differences--of the degree to which the variables differentiate between the groups. The measure of the belief that newspapers will be displaced by computerized data banks is the primary discriminating variable, followed by the variable measuring attitudes on whether computers will have a dehumanizing effect on society and gender. Although collectively variables 4 through 14 reduce the lambda statistics by about 10 percent, individually they have little ability to discriminate between preferences for either electronic newspapers or newspapers.

==========TABLE 5 ABOUT HERE==========

Table 5 lists the product-moment correlations of the discriminating variables in the descending order of magnitude. The coefficients identify how the discriminant function is related to the variables

within the groups. Positive attitudes toward computers are the most important discriminating variables within the groups for determining which individuals would be the most likely to prefer electronic newspapers over the printed version. Gender is also a fair discriminator as is newspaper reading behavior.

==========TABLE 6 ABOUT HERE==========

The standardized discriminant function coefficients are listed in Table 6 in descending order of magnitude. The coefficients, which are interpreted like beta weights in multiple regression analysis, give the relative contribution of each variable to the function. The individual variable contributing the most to the analysis is belief in newspaper displacement with a coefficient of .60. Gender is also a fairly important individual contributor (-.34) as are the attitudes on whether computers are dehumanizing (.30) and the rating of books as a source of information and knowledge (-.30).

==========TABLE 7 ABOUT HERE==========

Table 7 is a classification matrix which shows that 75 percent of the total cases were correctly classified.20 Seventy-five percent of the students preferring electronic newspapers were correctly classified on the basis of their scores on the discriminating variables and 76 percent of those preferring newspapers were correctly classified. However, with only two groups, one would expect that 50 percent of the cases would be accurately classified purely by chance

alone. The calculation of tau, a proportional reduction in error statistic, showed that the 75 percent classification is 50 percent higher than could be expected by chance.21

==========FIGURE 1 ABOUT HERE==========

The histogram in Figure 1 provides a graphic illustration of how the cases were classified and where the misclassifications occurred. The histogram provides a visual display of the density and distribution of each group on the discriminant function. The "1's" represent students preferring electronic newspapers and the "2's" represent students preferring to remain loyal to newspapers. An examination of the group centroids--the location of the means on each of the groups in the discriminant function space--shows how far apart the groups actually are. Most of the cases assigned to the electronic newspaper group are clustered near its centroid at -.77 and most of the cases assigned to the newspaper group are clustered near its centroid at .60. In general, cases that are the furthest away from the group centroids represent the cases that weren't accurately classified.

## SUMMARY AND IMPLICATIONS

The use of an upscale homogeneous sample that was computer literate provided the opportunity to gauge the support for electronic

newspapers among those who are the best candidates for being early adopters. The results show that 2 out of 5 students, if given the choice, would prefer to receive their news and information electronically. In addition, 2 out of 5 students believe that computerized data banks will eventually displace newspapers.

Support was found for the three hypotheses. Individuals preferring electronic newspapers were more computer oriented in terms of their attitudes and their use of computers. Also, men were more likely than women to want to receive their news and information electronically. The 14 variables entered into the discriminant analysis did moderately well in discriminating between the two newspaper preference groups. The most powerful discriminators were belief in the newspaper's ability to survive the challenge posed by computerized data banks as well as attitudes on whether computers will be a dehumanizing element in society. Gender, to a lesser extent, also discriminated between the newspaper loyalists and those who preferred electronic newspapers.

These findings are unsettling for the newspaper industry. Although the population studied is clearly not representative of American newspaper readers, the fact remains that two-fifths of the students surveyed say they are willing to desert their newspapers for an electronic version. This behavioral intent is particularly important since the market segment represented by the students--affluent and well educated--has traditionally been seen as including the best prospects for the next generation of newspaper readers. Although students preferring newspapers read a significantly greater number of

newspapers and rate newspapers more highly in terms of how important newspapers are to them personally as a source of news than do those who prefer electronic newspapers, it is noteworthy that even those favoring the electronic delivery of news and information are avid newspaper readers. Since the major differences between the groups were attitudes toward and use of computers, it appears that, as society as a whole becomes more familiar with computers, a major barrier to the acceptance of the delivery of news and information electronically will be overcome. And, since computers are being integrated into all types of academic life and learning, computer illiteracy will gradually decrease.

The study results suggest that a useful conceptual framework for separating potential users of new media systems from nonusers would be to determine the extent to which the new media require both the active participation and concentration of the user as well as technical skills and positive attitudes toward that technology. Even in the homogenous Stanford student sample, differences on a passive to active continuum were evident. For example, students preferring electronic newspapers rated books significantly higher as a source of information and knowledge than did newspaper loyalists. It simply takes less effort to read a newspaper than it does to read a book, and it takes less effort to read a book than it does to access news and information on a computer terminal. These differences could be expected to be even greater in the general population. It could be hypothesized that those least likely to use electronic newspapers would be those who rely primarily on the broadcast media--the most

passive media--for their news and information.

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10 Samuel H. Hagler and Philip D. Rosenberg, "Computer/Videodisc Device Simulates Home Information Services Environment of Future," Marketing News, 26 November 1982.

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12 "Channel 2000: Description and Findings of a Viewdata Test Conducted by OCLC in Columbus, Ohio, October-December, 1980," (Dublin, Ohio: OCLC Online Computer Library Center, Inc., 1981).

13 Everett M. Rogers, Diffusion of Innovations, 3rd Ed., (New York: The Free Press, 1983).

Murray Laver, Computers and Social Change, (Cambridge: Cambridge University Press, 1980).

15 Marc S. Tucker, "The Turning Point: Telecommunications and Higher Education," Journal of Communication, 33:118-130 (Winter 1983), p.124.

16 Carolyn Marvin and Mark Winther, "Computer-Ease: A Twentieth-Century Literacy Emergent," Journal of Communication, 33:92-108 (Winter 1983).

17 Smith, op. cit., p.261.

18 For an explanation of this scaling technique, see: Diana Stover Tillinghast, "The Use of Direct Magnitude Estimation Scales in Public Opinion Surveys," Public Opinion Quarterly, 44:337-384 (Fall 1980).

19 A comparison of sample demographics with official registration figures shows that the survey respondents are representative of the student body. Figures for Winter Quarter of 1983 show: 64% men, 36% women; 52% undergraduates and 48 percent graduate students; and 86% American and 14% foreign. Survey results for all three demographic categories are within the sampling error of plus or minus 4%.

20 Statisticians have noted that there can be an upward bias in the percent of cases correctly classified since package programs such as SPSS used in this analysis, use all n observations to calculate the discriminant function and then classify these same n respondents on this function.

21

$$\text{Tau} = \frac{\text{Cases correctly Classified} - (\text{Correct Classification Probability})(\text{Total Cases})}{\text{Total Cases} - (\text{Correct Classification Probability})(\text{Total Cases})}$$

TABLE 1

Means1,Standard Deviations2 and T-Test Results for
Electronic Newspaper and Print Newspaper Groups

| | Electronic Newspapers (n=196) | Printed Papers (n=252) | Both Groups (n=448) |
|---|---|---|---|
| Computer Attitudes | | | |
| DISPLACEMENT:The widespread access to computerized data banks will displace the print media as a major source of news and information.c | 2.45 (1.01) | 3.23 (1.08) | 2.89 (1.12) |
| DEHUMANIZING:The fear that computers will have a dehumanizing effect on society is largely unfounded.c | 2.52 (1.11) | 3.10 (1.16) | 2.85 (1.17) |
| CREATIVITY: Computers will help individuals to be more creative.c | 2.39 (1.00) | 2.90 (1.03) | 2.68 (1.05) |
| MAN OF THE YEAR: It was appropriate that Time chose computers as "Man of the Year."c | 2.90 (1.25) | 3.29 (1.23) | 3.12 (1.25) |
| INTIMIDATING: I am intimidated by computers.c | 1.88 (1.08) | 2.40 (1.23) | 2.18 (1.20) |
| TECHNICAL: I worry that computers will make our society too technical.c | 2.13 (1.06) | 2.61 (1.17) | 2.40 (1.15) |
| Media Behavior | | | |
| COMPUTER USE: Additive index of different types of computers used and how they were used.c | 5.34 (3.60) | 4.41 (3.19) | 4.82 (3.40) |
| NEWSPAPER USE: Additive index of daily and Sunday papers read.c | 1.43 (1.22) | 1.87 (1.23) | 1.68 (1.24) |

| | | | |
|---|---|---|---|
| **Media Ratings** | | | |
| BOOK INFO:Importance of books as a source of information.a | 888.63 (159.85) | 837.43 (210.27) | 858.96 (191.23) |
| COMPUTER INFO: Importance of computers as a source of information.c | 297.77 (336.79) | 193.20 (272.59) | 238.95 (306.44) |
| NEWSPAPER INFO: Importance of newspapers as a source of information.a | 591.61 (264.13) | 643.85 (249.05) | 621.00 (256.78) |
| TELEVISION INFO: Importance of television as a source of information.a | 365.24 (281.25) | 420.86 (298.27) | 396.53 (291.94) |
| MAGAZINE ENT: Importance of popular magazines as a source of entertainment.c | 386.07 (300.72) | 475.61 (275.05) | 436.44 (289.67) |
| NEWSPAPER NEWS: Importance of newspapers as a source of news.b | 733.71 (218.46) | 793.91 (185.92) | 767.58 (202.79) |
| **Demographics** | | | |
| GENDERc: (Coded as Dummy variable: 0=female; 1=male) | 0.73 (0.44) | 0.55 (0.49) | 0.63 (0.48) |

1 Group means and standard deviations are based on results of the discriminant analysis of 448 cases. Significance levels are based on separate one-tailed t-test analyses. Since the n's for the t-tests ranged up to 480 cases, the means for the t-tests showed a very slight variation from the ones reported here.

2 Standard Deviations are in parentheses.

a < = .05
b < = .01
c < = .001

TABLE 2

Crosstabulation of Computer Use by Gender

| | | Gender | | |
|---|---|---|---|---|
| Count / Row Pct / Col Pct / Tot Pct | | Female 0. | Male 1. | Row Total |
| Computer Use | 1. Low | 96 / 49.0 / 48.0 / 18.3 | 100 / 51.0 / 30.7 / 19.0 | 196 / 37.3 |
| | 2. Moderate | 59 / 37.8 / 29.5 / 11.2 | 97 / 62.2 / 29.8 / 18.4 | 156 / 29.7 |
| | 3. High | 45 / 25.9 / 22.5 / 8.6 | 129 / 74.1 / 39.6 / 24.5 | 174 / 33.1 |
| Column Total | | 200 / 38.0 | 326 / 62.0 | 526 / 100.0 |

Chi square = 20.91 with 2 df
p < .001
Gamma = 0.33
Number of Missing Observations = 3

TABLE 3

Crosstabulation Of Preference For Electronic Newspaper and Print Newspaper by Gender

| Count / Row Pct / Col Pct / Tot Pct | Gender: Female (0.) | Gender: Male (1.) | Row Total |
|---|---|---|---|
| 1. Prefer Electronic Newspaper | 56<br>27.5<br>32.4<br>12.0 | 148<br>72.5<br>50.3<br>31.7 | 204<br>43.7 |
| 2. Prefer Printed Newspaper | 117<br>44.5<br>67.6<br>25.1 | 146<br>55.5<br>49.7<br>31.3 | 263<br>56.3 |
| Column Total | 173<br>37.0 | 294<br>63.0 | 467<br>100.0 |

Corrected Chi Square = 13.58 with 1 df
p <.001
Gamma = -.36
Number of Missing Observations = 62

TABLE 4

Summary of Discriminant Function Stepwise Analysis

| Step Entered | Discriminating variables | Wilks Lambda |
|---|---|---|
| 1 | Displacement | 0.88a |
| 2 | Dehumanizing | 0.82a |
| 3 | Gender | 0.79a |
| 4 | Newspaper Use | 0.77a |
| 5 | Book Info | 0.75a |
| 6 | Man Of Year | 0.74a |
| 7 | Creativity | 0.73a |
| 8 | Magazine Entertainment | 0.72a |
| 9 | Intimidating | 0.71a |
| 10 | Newspaper News | 0.71a |
| 11 | Newspaper Info | 0.70a |
| 12 | Computer Info | 0.69a |
| 13 | Television Info | 0.69a |
| 14 | Computer Use | 0.68a |

Canonical Correlation = .56; Eigenvalue = .45

The final Wilks' Lambda of .68 for the discriminant function has a chi square value of 163.05 with 15 df.

a $p<.001$

TABLE 5

Pooled Within-groups Correlations Between
Canonical Discriminant Function and
Discriminating Variables

| Discriminating Variables | Function |
|---|---|
| Displacement | .55 |
| Dehumanizing | .39 |
| Creativity | .37 |
| Intimidating | .33 |
| Gender | -.29 |
| Technical | .27 |
| Newspaper Use | .26 |
| Computer Info | -.26 |
| Man of the Year | .23 |
| Magazine Ent | .23 |
| Newspaper News | .22 |
| Computer Use | -.20 |
| Book Info | -.19 |
| Newspaper Info | .15 |
| Television Info | .14 |

TABLE 6

Standardized Canonical Discriminant Function Coefficients

| Discriminating Variables | Function |
|---|---|
| Displacement | .60 |
| Gender | -.34 |
| Dehumanizing | .30 |
| Book Info | -.30 |
| Newspaper News | .28 |
| Newspaper Use | .26 |
| Man of the Year | .24 |
| Creativity | .22 |
| Intimidating | .22 |
| Magazine Ent | .22 |
| Newspaper Info | -.22 |
| Computer Info | -.21 |
| Television Info | .17 |
| Computer Use | .16 |

TABLE 7

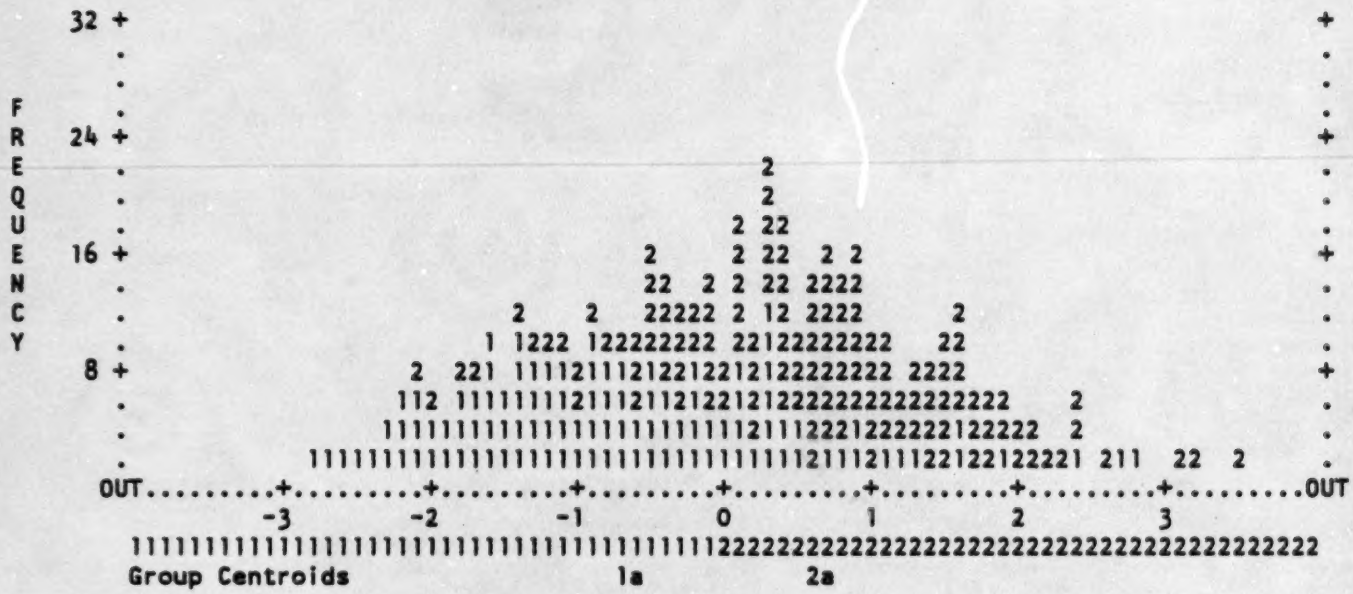
Classification Matrix

| Actual Group | # Cases | Predicted Group Membership: Electronic Newspapers | Predicted Group Membership: Printed Newspapers |
|---|---|---|---|
| Electronic Newspapers | 196 | 146<br>74.5% | 50<br>25.5% |
| Printed Newspapers | 252 | 61<br>24.2% | 191<br>75.8% |

Percent of "GROUPED" Cases Correctly Classified: 75.2%

FIGURE 1

Discriminant Function: Histogram Showing
Classification of Electronic Newspapers and Printed Newspapers




1Group Centroid = -.77 for Group 1, students preferring electronic newspapers.

2Group Centroid = .60 for Group 2, students preferring newspapers.